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Water Pollution Control - W.G.
Krummrich Plant, Monsanto
Co., 7-16-~~72~~74

1
ENTATIONS

CER 092184

CONFIDENTIAL 92-CV-204-WDS

July 10, 1978

WATER POLLUTION CONTROL - W.G. KRUMMRICH PLANT
MONSANTO COMPANY

Deil
- Classification
found the background
FBI affected
file

INTRODUCTION:

I think most of you are familiar with the functions of the Environmental Control Group, but for those of you who recently joined the Krummrlich Plant, I'll spend a few minutes discussing the subject.

Organization wise the Environmental Control Group is part of the Personnel Department and is headed by Paul Heisler our Director of Safety and Environmental Control. We have three engineers in the group who are responsible for all of its functions.

Clarrie Buckley who reports to Paul Heisler is responsible for methods development and emission monitoring and he has Robert Harness reporting to him who handles Air Pollution and Solid Waste problems.

We have three full time technicians in our group who collect samples, monitor tests and investigate source emissions.

I report to Paul Heisler and my responsibilities include all aspects of Water Pollution Control within the plant, liaison with the Village of Sauget for all Environmental matters, and the operation of the existing Waste Treatment Plant for the Village of Sauget.

Today I will briefly discuss the existing methods used to treat the wastewater from the Krummrlich Plant and then fully detail our plans for meeting existing and proposed Water Quality and effluent standards.

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SLIDES

- #1 Water Pollution Control At W.G.K.
- #2 Existing Situation
- #3 Federal EPA Regulations
- #4 Illinois EPA Regulations
- #5 Water Quality Criteria
 - a. Measured in receiving stream after mixing
 - b. Represent background levels in the Mississippi River
 - c. Restrictive standard - must be met - Zero discharge of contaminant if WQSTDS are not met
- #6 Effluent Criteria
 - a. Concentration Standard
 - b. Measured in the Effluent from the Treatment Plant
- #7 Illinois EPA Sewer Construction Permit
- #8 Sewer Permit Requirements 1 and 2
- #9 Sewer Permit Requirements 3 and 4
- #10 Village Sewer System
- #11 Village Sewer System Layout
- #12 Flow Diagram - Primary Treatment Plant
 - a. Definition Primary Treatment
 - b. % Removal 70% S.S. and 25% C.O.D.
- #13 Sauget Chemical Treatment Plant
 - a. First step toward requirement for secondary treatment
 - b. Secondary Treatment 90-95% Removal BOD₅ and S.S.
 - c. Definition of BOD₅
- #14 CTP Capital Costs

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#15 CTP O&M Costs

#16 Effluent Quality - Chemical Treatment Plant

- a. Organics which may or may not show up as BOD₅ will not meet future standards
- b. Federal EPA has developed a list of Hazardous and toxic materials which includes some well known organic chemicals (ONCB)

#17 Alternatives for Secondary Treatment of CTP Effluent

- a. Most cost effective solution is biological treatment
- b. Extensive tests have shown that Sauget Wastewaters lack essential nutrients and is toxic to biological treatment
- c. Bio Treatment will work if the effluent from the CTP is mixed and diluted with Municipal Domestic Wastewater
- d. SWIMPAC proposed Regional Treatment for the Metro East Area as the most cost effective solution for meeting the Federal and State Secondary Treatment Standards.
- e. RETA, a local Environmental consulting firm, confirmed our treatability studies showing that a Regional Bio Treatment Plant would work.
- f. A Grant application for the Regional Plant has been submitted to the EPA.

#18 Regional Waste Treatment

#19 Metro East Service Area

- a. Lansdowne Plant, East St. Louis, Sauget and Cahokia
- b. Total Population over 150,000

#20 Unit Operations

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- #21 1995 Flow Projections
- #22 Design Parameters
- #23 Force Main Size and Length
- #24 Capital and Operating Costs
 - a. 75% Federal EPA Grant
 - b. Monsanto Total Cost 4.8 M 20 Years
 - c. \$240,614/yr. Debt Service + \$323,114 Operating
- #25 Regional Effluent Quality
- #26 WCK In Plant Reductions
- #27 Flow Reductions
 - a. 6 Projects complete
 - b. Well Water Recycle Complete
 - c. Flow tests are being conducted to confirm savings
- #28 Cl₂ Dump Project
- #29 200ppm Cl₂ Project
- #30 Organic Removals
 - a. Proposed Federal EPA Hazardous and Toxic Substances list includes organics
 - b. Chemical and Regional Treatment does not remove some organic chemicals
 - c. Projects will not be developed until standards are adopted.

M.R. Foresman
July 16, 1974

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WATER POLLUTION CONTROL

W.G. KRUMMRICH PLANT

MONSANTO COMPANY

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EXISTING SITUATION - WATER POLLUTION CONTROL

- 40 Operating Departments Discharging over 7000 GPM of Wastewater
- All Wastewater flows to a combined storm water and process water sewer system which eliminates any possibility of segregation of non-contact cooling water
- Existing State and Federal laws require treatment of all wastewater prior to discharge to a receiving stream

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FEDERAL
EPA REGULATIONS

- I. Federal EPA has approved Illinois EPA Standards
- II. Publicly owned treatment works
 - A. July 1, 1977 - Effluent limitations - Secondary Treatment
 - B. July 1, 1983 - Best Practicable Technology
- III. Industrial Standards
 - A. Effluent Criteria
 - B. Pre-Treatment Standards

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ILLINOIS EPA
REGULATIONS

- I. WATER QUALITY STANDARDS
- II. EFFLUENT STANDARDS
- III. SECONDARY TREATMENT
- IV. PERMITS

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WATER QUALITY CRITERIA

MISSISSIPPI RIVER

<u>Constituent</u>	<u>Conc. mg/l</u>
ARSENIC	0.01
BARIUM	1.0
CADMIUM	0.01
CHLORIDE	250
CHROMIUM-HEX	0.05
COPPER	0.02
CYANIDE	0.01
FLUORIDE	1.4
IRON (D)	0.3
LEAD	0.05
MANGANESE	0.05
MERCURY (T)	0.0005
PHENOLS	0.001
SELENIUM	0.01
SILVER	0.005
TOTAL SOLIDS (D)	500
ZINC	1.0
BOD ₅	7.0
CARBON CHLOROFORM EXT	0.2
OIL (HEXANE SOLUBLE)	0.1
SULFATE	250
NITRATES & NITRITES AS N	10.0
METHYL BLUE ACTIVE SUB	0.5
AMMONIA NITROGEN	1.5

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EFFLUENT CRITERIA

<u>Constituent</u>	<u>Conc. mg/l</u>
ARSENIC (TOTAL)	0.25
BARIUM (TOTAL)	2.0
CADMIUM (TOTAL)	0.15
CHROMIUM (HEX)	0.3
CHROMIUM (TRI)	1.0
COPPER (TOTAL)	1.0
CYANIDE	0.025
FLUORIDE (TOTAL)	2.5
IRON (TOTAL)	2.0
IRON (DISSOLVED)	0.5
LEAD (TOTAL)	0.1
MANGANESE (TOTAL)	1.0
MERCURY (TOTAL)	0.0005
NICKEL (TOTAL)	1.0
OIL (HEXANE SOLUBLES)	15.0
pH	5 - 10
PHENOLS	0.3
SELENIUM (TOTAL)	1.0
SILVER	0.1
ZINC (TOTAL)	1.0
TOTAL SUSPENDED SOLIDS	25.0
TOTAL DISSOLVED SOLIDS	750 above background
BOD ₅	20
COLOR - Below Obvious Level	

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ILLINOIS EPA SEWER
CONSTRUCTION PERMITS

- I. REGULATIONS NOT DEFINITE
- II. REQUIRE 90 DAY LEAD TIME FOR APPROVAL
- III. REGULATIONS HAVE BEEN INTERPRETED FOR THE
W.G.K. PLANT

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1. CONSTRUCTION OF NEW SEWERS OR MODIFICATIONS OF EXISTING SEWERS WHICH ARE 18 INCHES IN DIAMETER OR LARGER.
2. CONSTRUCTION OF NEW SEWERS WHICH REQUIRE A TIE-IN TO A NEW OR EXISTING SEWER 18 INCHES IN DIAMETER OR LARGER, TIE-IN BEING A DIRECT CONNECTION WITH OR WITHOUT A MANHOLE.

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3. MODIFICATIONS OF AN EXISTING SEWER WHERE
THE MODIFICATION INCLUDES THE MODIFICATION
OF THE TIE-IN TO AN EXISTING SEWER 18 INCHES
IN DIAMETER OR LARGER.
4. DRAWING #TS-D-10580 SHOULD BE USED AS A
GUIDE FOR DETERMINING CONSTRUCTION PERMIT
REQUIREMENTS.

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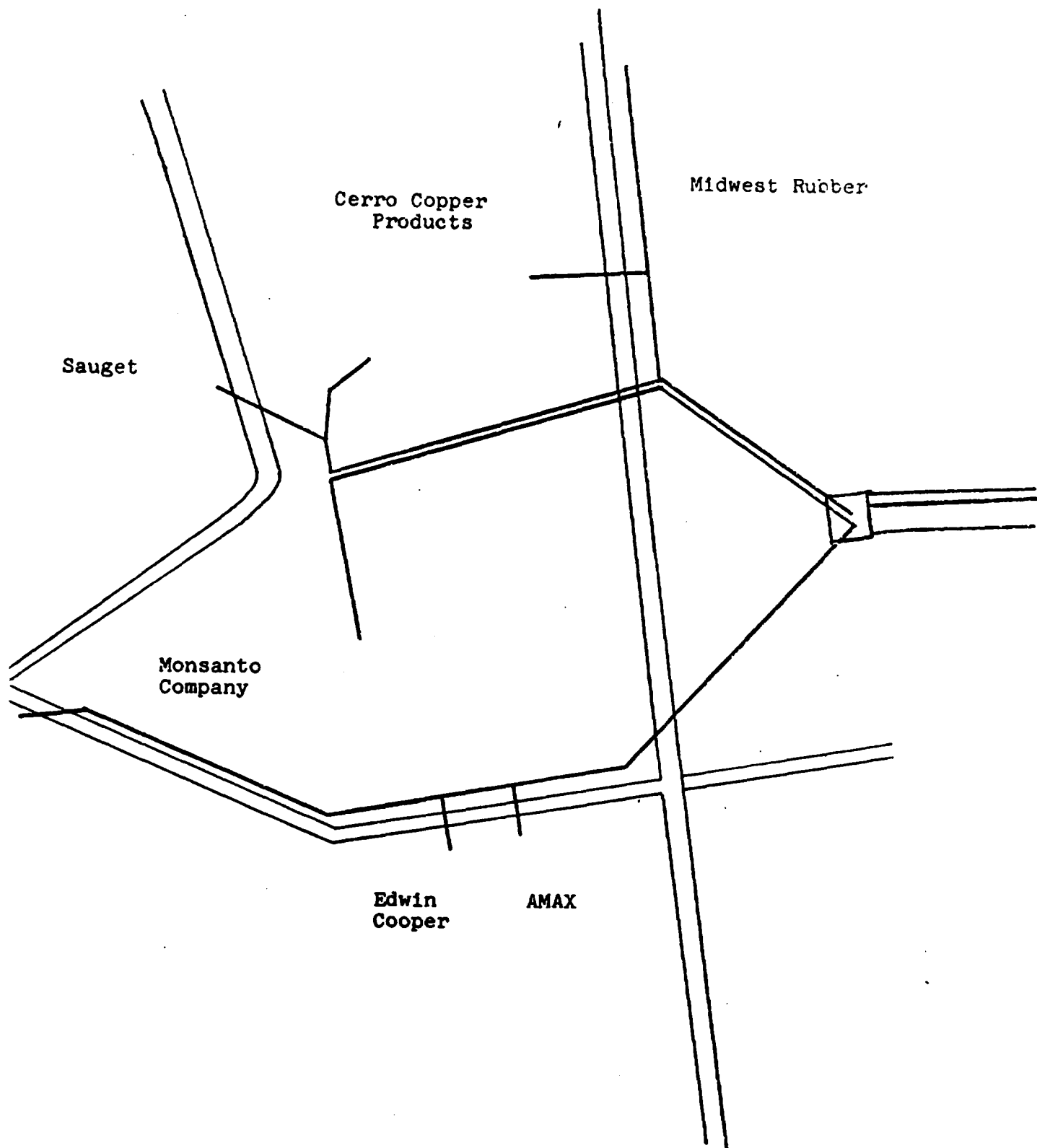
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VILLAGE OF SAUGET
SEWER SYSTEM

- COMBINED SANITARY AND STORM WATER
- FIVE MAJOR INDUSTRIES PLUS SAUGET VILLAGE
- AVERAGE FLOW - 18 MGD
- MAXIMUM FLOW - 38 MGD

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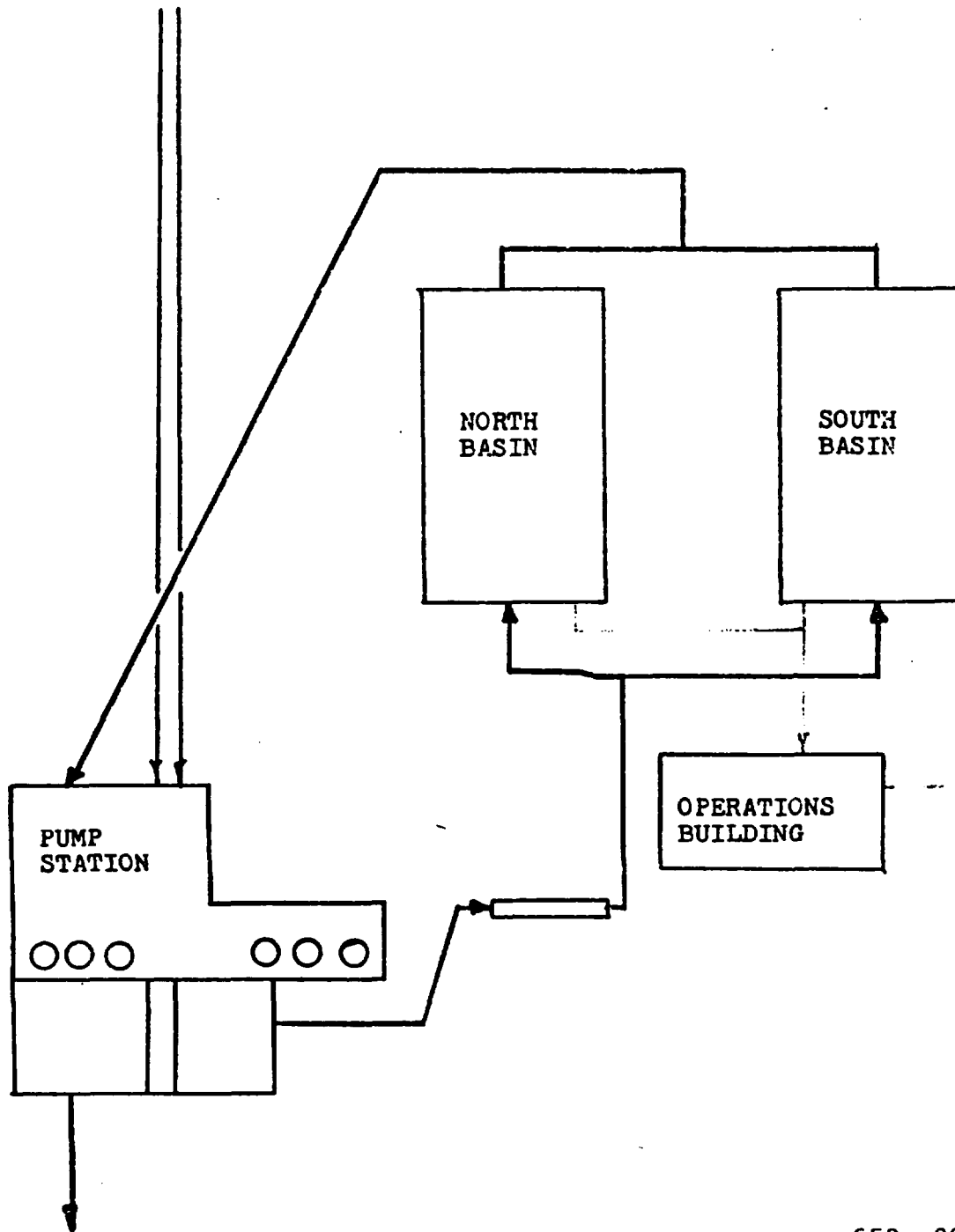
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SAUGET PRIMARY TREATMENT PLANT



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SAUGET CHEMICAL TREATMENT PLANT

I. UNIT OPERATIONS

- A. SCREENING
- B. PUMPING STORM WATER TREATMENT
- C. GRIT REMOVAL
- D. NEUTRALIZATION
- E. POLYMER ADDITION
- F. FLOCCULATION
- G. CLARIFICATION
- H. SLUDGE REMOVAL - VACUUM FILTRATION
- I. SCUM REMOVAL

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CAPITAL COST DISTRIBUTION

VILLAGE OF SAUGET CHEMICAL TREATMENT PLANT

<u>CONTRIBUTOR</u>	<u>% DISTRIBUTION</u>	<u>CAPITAL COST (M)</u>
AMAX	3.1178	0.25
CERRO	11.0088	0.88
COOPER	6.8852	0.55
MIDWEST	2.3594	0.19
MONSANTO	66.6288	5.33
VILLAGE	10.0000	<u>0.80</u>
		8.0 M

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OPERATING COST DISTRIBUTION
VILLAGE OF SAUGET CHEMICAL TREATMENT PLANT

<u>CONTRIBUTOR</u>	<u>O & M (\$)</u>
AMAX	11,109
CERRO	34,747
COOPER	20,004
MIDWEST	10,733
MONSANTO	483,914
VILLAGE	8,721

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EFFLUENT QUALITY

SAUGET CHEMICAL TREATMENT PLANT

- Effluent will meet majority of Effluent Standards
- Effluent will not meet Standards for:
 - BOD₅
 - Suspended Solids
 - Total Dissolved Solids
 - Phenol
 - Mercury (Special Case)

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ALTERNATES FOR SECONDARY TREATMENT OF CHEMICALLY TREATED EFFLUENT

- I. BIOLOGICAL OXIDATION**
- II. CARBON ADSORPTION**
- III. CHEMICAL OXIDATION**
- IV. COMBINATION OF THE ABOVE**

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**REGIONAL
WASTE TREATMENT
W. G. KRUMMRICH
PLANT
MONSANTO COMPANY**

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EPA/CERRO COPPER/EIL/PCB ATTORNEY WORK PRODUCT / ATTORNEY CLIENT PRIVILEGE

METRO-EAST REGIONAL WASTEWATER TREATMENT FACILITY STUDY

- Legend
- EXISTING TREATMENT PLANT
 - PROPOSED TREATMENT PLANT
 - PROPOSED FORCED MAIN SEWER
 - LEVEE
 - AREA SERVED BY TREATMENT PLANT
 - STATE LINE
 - MAJOR RAILROAD LAND

GRANITE
CITY
AREA

LANSDOWNE
AREA

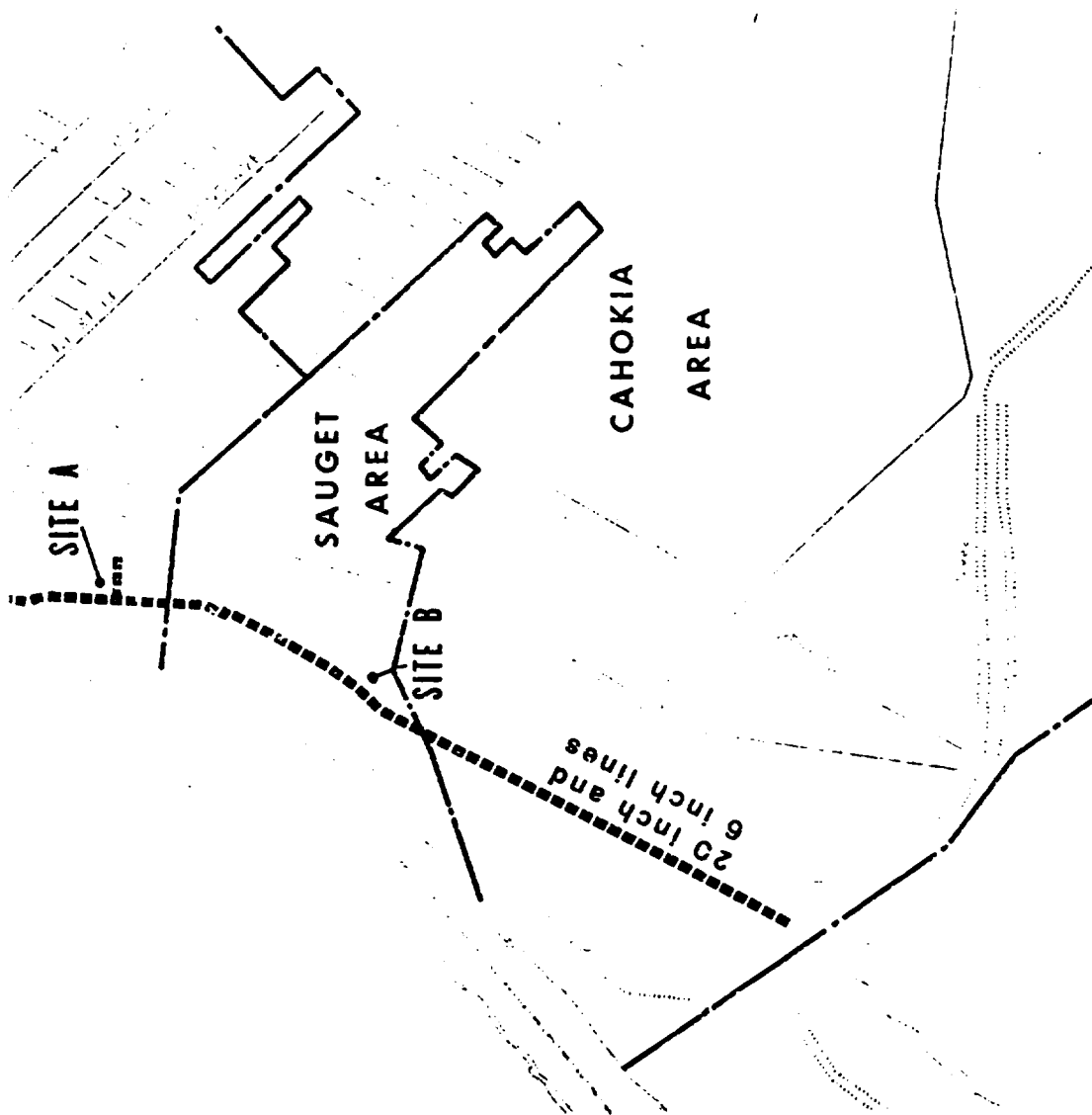
30 inch and
6 inch lines

EAST ST. LOUIS

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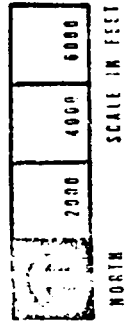
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EPA/CERRO COPPER/EIL/PCB ATTORNEY WORK PRODUCT / ATTORNEY CLIENT PRIVILEGE



Ryckman - Edgerley - Tomlinson & Associates

PLATE 2



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UNIT OPERATIONS

● AERATION BASINS

● CLARIFICATION

● CHLORINATION

● MICRO-STRAINERS

● SLUDGE HANDLING

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REGIONAL WASTE TREATMENT

PROJECTED 1955 FLOWS

<u>PRIMARY TREATMENT PLANTS</u>	<u>AVE. DAILY FLOW (MGD)</u>	<u>MAX. FLOW (MGD)</u>
LANSDOWNE	6.2	10.0
East St. Louis	18.0	22.0
Sauget	7.1	11.5
Cahokia	<u>4.8</u>	<u>7.5</u>
	36.1	51.0

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DESIGN PARAMETERS

Design Flow	37 MGD
Peak Flow	51 MGD
Design BOD Concentration	220 Mg/l
Design SS Concentration	200 Mg/l

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FORCE MAIN SIZE SIZE AND LENGTH

From Lansdowne	21,000' @ 30"
From East St. Louis	7,000' @ 36"
From Sauget	700' @ 20"
From Cahokia	14,000' @ 20"

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REGIONAL SECONDARY TREATMENT

WITH STORM WATER TREATMENT AND MODIFICATIONS AT PRIMARY PLANTS

	<u>CAPITAL COSTS</u>	<u>ANNUAL OPERATION AND MAINTENANCE COSTS *</u>
Storm Water Treatment and Modifications at Primary Plants		
Lansdowne	\$ 834,000	\$ 122,850
E. St. Louis	3,323,250	358,450
Sauget	799,000**	64,800**
Cahokia	<u>703,300</u>	<u>80,500</u>
Subtotal	\$ 5,659,550	\$ 626,600
Secondary Treatment	<u>26,598,100</u>	<u>2,137,000</u>
Total	\$32,257,650	\$ 2,763,600

Individual Primary and Secondary Treatment Including Storm Water Treatment

Lansdowne	\$ 8,704,600	\$ 784,250
E. St. Louis	14,304,900	1,359,100
Sauget	9,775,000	992,000
Cahokia	<u>6,293,300</u>	<u>581,900</u>
Total	\$39,077,800	\$ 3,717,250

*Includes debt service on 25 percent of capital cost
(6 percent over 20 years).

**Includes storm water treatment only.

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MERTA REGIONAL
TREATMENT PLANT
EFFLUENT QUALITY

EFFLUENT WILL MEET ALL KNOWN STANDARDS THROUGH
1983 WITH THE POSSIBLE EXCEPTION OF:

TOTAL DISSOLVED SOLIDS
COLOR (SUBJECT TO INTERPRETATION)
SELECTED ORGANICS (ONCB, PNCB, PCB)

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W.G. KRUMMRICH PLANT

IN PLANT REDUCTIONS

CHEMICAL AND REGIONAL

WASTE TREATMENT

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PROBLEM MINIMIZE CAPITAL COST OF WASTE TREATMENT

**SOLUTION: REDUCE WASTEWATER FLOW TARGET SET
 AT 3500 GPM (7000 GPM EXISTING)**

**METHOD: 25 FLOW REDUCTION PROJECTS SCHEDULED
 FOR COMPLETION ON OR BEFORE JANUARY
 1, 1975**

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PROBLEM MINIMIZE EFFECTS OF Cl_2 DUMPS AND TREATMENT
PLANT

SOLUTION: RETAIN AND TREAT Cl_2 DUMPS WITHIN
AC1 DEPARTMENT.

METHOD: PROJECT TO RETAIN AND NEUTRALIZE Cl_2
GENERATED BY PROCESS UPSETS HAS
SCOPED COMPLETE CONSTRUCTION BY
JANUARY 1, 1975.

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PROBLEM REDUCE Cl_2 TO BELOW TOXIC LEVEL FOR DISCHARGE
 INTO REGIONAL BIOLOGICAL TREATMENT PLANT

SOLUTION: RECYCLE AND TREAT ALL WASTEWATER FROM
 AC1 TO BELOW 200 ppm Cl_2

METHOD: PROJECT SCOPE COMPLETE. COMPLETION
 REQUIRED PRIOR TO REGIONAL STARTUP
 ON JULY 1, 1977.

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PROBLEM ORGANICS NOT REMOVED - REGIONAL TREATMENT
PLANT. (ONCB, PNA, ONA)

SOLUTION: DEVELOP METHODS FOR SELECTIVE REMOVAL
OF PROBLEM ORGANICS

METHOD: REMOVAL PROCESS DEFINED:
CARBON ADSORPTION
OZONE TREATMENT

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TOTAL DISSOLVED SOLIDS - W.G. KRUMMRICH

SITUATION:

Existing standard set at 750 ppm above background (400 ppm) up to 3500 ppm maximum if caused by pollution control processes or equipment.

- Monsanto effluent now at 2200 ppm TDS
- Adiabatic Absorber Project would not bring Monsanto effluent down to 1150 ppm.
- Questionable as to compliance with 3500 ppm in Chemical Treatment Plant effluent
- Limited in any effect on receiving stream
- If compliance with standard is required we need to get credit for +1.0 M spent on Adiabatic Absorber Project
- TSD Reductions should be made where cost effective.

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PROJECT CONSIDERATIONS - W.G. KRUMMRICH PLANT

All TSD/CED Projects should consider:

- A. Flow Reductions - Based on Capital and Operating
Cost savings
- B. Organic Reductions- Future savings when Regional
Treatment is Operational
- C. Total Dissolved Solids - Future compliance with
3500 ppm standard may
be required
- D. Construction permits for the sewer projects

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